CLAIMS

1. A backlight comprising a discharge tube, a reflector for reflecting light radiated from said discharge tube, and a heat conduction member attached to said reflector in contact with a part of said discharge tube, so that a part of said discharge tube is locally cooled by said heat conduction member.

2. A backlight according to claim 1, wherein said heat conduction member is adhered to at least one of said discharge tube and said reflector, or is in a bonding state equal to or stronger than a hydrogen bond.

3. A backlight according to claim 1, wherein said heat conduction member comprises a non metal.

4. A backlight according to claim 1, wherein said heat conduction member comprises at least one of a heat conductive resin, a heat conductive rubber and an adhesive.

5. A backlight according to claim 1, wherein a heat radiation member is provided in contact with at least one of said heat conduction member and said reflector.

6. A backlight according to claim 1, wherein a container containing therein a material exhibiting a cooling function by phase transition is provided in contact with said heat conduction member.

7. A backlight according to claim 1, wherein an electrically controllable cooling member is provided in contact with at least one of said heat conduction member and said reflector.

8. A backlight comprising a plurality of discharge tubes, a reflector covering said discharge tubes for reflecting light radiated from said discharge tubes, and blowing means for blowing air to a part of said discharge tubes between said discharge tubes.

9. A backlight comprising a light source device, a light guide plate receiving light from said light source device, a polarization separating element disposed on one

side of said light guide plate, and an interference type mirror disposed on the other side of said light guide plate;

wherein said polarization separating element comprises an element which allows a first linearly polarized light having a plane of polarization including a transmission axis to transmit therethrough and a second linearly polarized light having a plane of polarization including a reflection axis to be reflected thereby;

wherein said interference type mirror comprises an interference type mirror having a multi-layered structure including a plurality of layers having birefringence, and directions in which a difference between refractive indices of adjacent layers taken within respective layer planes and in the same directions becomes maximum, or directions of slow axes or fast axes of layers having birefringence are generally aligned with each other in at least two layers; and

wherein an angle between the direction of a reflection axis of said polarization separating element and the direction in which the difference between refractive index of the adjacent layers of said interference mirror taken in the layer planes and in the same directions becomes maximum, or an angle between the direction of the reflection axis of said polarization separating element and the direction of the fast axis or the slow axis of the layer having birefringence of said interference mirror, is within the range of 23 to 67 degrees.

10. A backlight comprising a discharge tube containing mercury in which almost all the liquid mercury except for an amount of gaseous mercury at the time of discharge is collected at a first position apart from an end of said discharge tube, and a cooling device for cooling said first position of said discharge tube.

11. A backlight according to claim 10, further

comprising a reflector for reflecting a ray of light radiated from said discharge tube and a light guide plate receiving the ray of light radiated from said discharge tube and the ray of light reflected by said reflector.

12. A backlight according to claim 10, wherein said discharge tube has electrodes at opposite ends thereof, and said first position is located within a range spaced apart by 10D or by at least 0.25L from a tip of said electrode at each end of said discharge tube, where an inner diameter of said discharge tube is D and a distance between the electrodes at opposite ends of said discharge tube is L.

13. A backlight according to claim 12, wherein said first position possesses a limited portion in said range or a whole portion in said range.

14. A backlight according to claim 10, wherein said mercury comprises mercury particles having a size of not greater than 0.2 mm, or said mercury soaks into a fluorescent material applied to an inner wall of said discharge tube.

15. A backlight according to claim 10, wherein said discharge tube contains a rare gas, and said rare gas does not contain argon.

16. A backlight according to claim 15, wherein electrodes of said discharge tube comprise carbon nanotube.

17. A backlight according to claim 15, wherein said cooling device comprises a thermo-chromic material coming into contact with said discharge tube, or a transparent material containing a thermo-chromic material.

18. A backlight according to claim 10, wherein said cooling device comprises a heat conduction member positioned to come into contact with said first position of said discharge tube, or positioned in the proximity of said first position of said discharge tube.

19. A backlight according to claim 10, wherein said cooling device comprises blowing means blowing air to

said first position of said discharge tube.

20. A backlight according to claim 10, wherein said cooling device includes a cooling capacity varying mechanism.

21. A backlight according to claim 10, wherein said cooling device includes a movable heat conduction member.

22. A display device comprising a display unit and a backlight, said backlight comprising a discharge tube containing mercury in which almost all the liquid mercury except for an amount of gaseous mercury at the time of discharge is collected at a first position apart from each end of said discharge tube, and a cooling device for cooling said first position of said discharge tube.

23. A method of producing a backlight having a discharge tube containing mercury, said method comprising the steps of:

collecting almost all liquid mercury except for an amount of gaseous mercury at the time of discharge to a first position of a discharge tube apart from an end of said discharge tube; and

thereafter, disposing a cooling device for cooling said first position of said discharge tube.

24. A method of producing a backlight having a discharge tube containing mercury, said method comprising the steps of:

collecting almost all liquid mercury except for an amount of gaseous mercury at the time of discharge to a first position of a discharge tube apart from an end of said discharge tube; and

thereafter, assembling said discharge tube into a backlight keeping said first position at a relatively low temperature.

25. A method of fabricating a backlight according to claim 23 or 24, wherein said step of collecting liquid mercury comprises cooling said first position of said discharge tube and heating portions of said discharge tube other than said first position.

26. A method of fabricating a backlight according to claim 25, wherein said discharge tube is placed into a heating furnace having a cooling device in order to cool said first position of said discharge tube and to cool portions other than said first position of said discharge tube.

27. A method of fabricating a backlight according to claim 26, wherein said heating furnace is heated to a temperature higher than 300°C.

28. A display device comprising:

a light source device having a discharge tube containing mercury in which liquid mercury is collected at a first position, and a cooling device capable of cooling said first position of said discharge tube and of varying a cooling capacity; and

a display element illuminated by said light source device.

29. An optical sheet comprising a diffusion portion having a plurality of spaced apart projections facing to one side and having scattering property, and valley portions positioned between said projections, whereby a part of the light outgoing from said valley portion travels without coming into contact with the adjacent projections, another part of the light outgoing from said valley portion is made incident to adjacent projections and is scattered by said projections, and the light travelling in said projections is scattered by said projections and outgoes from said projections.

30. An optical sheet according to claim 29, wherein said projection has a proximal portion and a tip portion, and a ratio of a quantity of light outgoing from said tip portion of said projection to a quantity of light made incident to said proximal portion of said projection is not greater than 30%.

31. An optical sheet according to claim 29, wherein the projection contains a plurality of small scattering material particles.

portions positioned between said projections, and a reflecting mirror arranged on said diffusion portion on the side opposite to said one side.

39. An optical sheet according to claim 38, wherein a base sheet layer is interposed between said diffusion portion and said reflecting mirror.

40. An optical sheet according to one of claims 29, 33, 35 and 38, wherein a layer of a transparent material is disposed on said diffusion portion on said one side thereof so that said valley portions are substantially buried.

41. An optical sheet comprising a diffusion portion having a plurality of portions having non-uniform refractive index and portions having a uniform refractive index and interposed between said portions having non-refractive index, wherein said diffusion portion comprises a mesh containing filaments and an ink containing a resin, and said mesh is buried in said ink.

42. An illumination device comprising a light source, a light guide plate into receiving a ray of light of said light source, and said optical sheet according to one of claims 29 to 41, disposed on one side of said light guide plate.

43. A liquid crystal display device comprising a light source, a light guide plate receiving a ray of light of said light source, said optical sheet according to one of claims 29 to 41, disposed on one side of said light guide plate, and a liquid crystal panel.

44. A method of fabricating an optical sheet including a diffusion portion having a plurality of spaced apart projections, facing to one side and having scattering property, and valley portions positioned between said projections, said method comprising the steps of screen-printing ink using a mesh including crossing linear members, whereby said diffusion portion having said projections and said valley portions positioned between said projections is formed.

32. An optical sheet according to claim 31, wherein a base sheet layer is disposed on the diffusion portion on the side opposite to said one side, the base sheet layer contains a plurality of small scattering material particles, and the scatter material particles of the base sheet are substantially the same as those of the projections and are distributed in substantially uniform density.

33. An optical sheet comprising a diffusion portion having a plurality of spaced apart projections facing to one side, and valley portions positioned between said projections, wherein a layer having scattering property is disposed on surfaces of said projections.

34. An optical sheet according to claim 33, wherein a base sheet portion is disposed on said diffusion portion on the side opposite to said one side.

35. An optical sheet comprising a diffusion portion having a plurality of spaced apart projections facing to one side and having scattering property, and valley portions positioned between said projections, wherein each of said projections comprises a group of small scattering materials gathering together.

36. An optical sheet comprising a diffusion portion having a plurality of spaced apart portions having a non-uniform refractive index, and a plurality of portions positioned between said portions having a non-uniform refractive index and having a uniform refractive index.

37. An optical sheet comprising a diffusion portion, having a plurality of spaced apart wall members and having scattering property and openings formed between said wall members, wherein said wall member has first and second opposite side surfaces, and is constituted so that light is substantially scatter-reflected at said first and second side surfaces.

38. An optical sheet comprising a diffusion portion having a plurality of spaced apart projections facing to one side and having scattering property and valley

45. A method of fabricating an optical sheet according to claim 44, wherein the screen-printing step comprises one of the steps of (a) applying the ink to a support surface and putting the mesh to the ink so applied, and (b) placing the mesh on a support surface and applying the ink from above the mesh.

46. A method of fabricating an optical sheet according to claim 45, wherein the screen-printing step includes one of the steps of (a) removing the mesh from the ink and (b) leaving the mesh as buried in the ink, after the screen-printing step of the ink by using the mesh.

47. A method of fabricating an optical sheet according to claim 45, further comprising the step of forming a base sheet portion containing a scattering material before the screen-printing step, wherein the screen-printing step includes a step of applying ink to the base sheet portion.

48. An optical member comprising a plate-like body having a light turning region and a light guide region contiguous to said light turning region, wherein said light turning region has a plurality of spaced apart portions having non-uniform refractive index and portions having a uniform refractive index and positioned between said portions having non-uniform refractive index, and said light guide region is a substantially transparent region.

49. A light source device comprising a discharge tube, a reflector for reflecting a ray of light radiated from said discharge tube, and support members supporting said discharge tube to said reflector, said support members being formed of a heat insulating structure so as to prevent a temperature drop of a portion of said discharge tube near electrodes of said discharge tube.

50. A light source device comprising a discharge tube, a reflector for reflecting a ray of light radiated from said discharge tube, and support members supporting

said discharge tube to said reflector, said discharge tube being partially formed of a heat insulating structure so as to prevent a temperature drop of a portion of said discharge tube near electrodes of said discharge tube.

51. A light source device comprising a discharge tube, a reflector for reflecting a ray of light radiated from said discharge tube, and support members supporting said discharge tube to said reflector, said support members being arranged at inward positions from ends of electrodes of said discharge tube so as to prevent a temperature drop of a portion of said discharge tube near the electrodes of said discharge tube.

52. A light source device comprising a discharge tube, a reflector for reflecting a ray of light radiated from said discharge tube, support members arranged at positions near electrodes of said discharge tube for supporting said discharge tube to said reflector, and a heat conduction member contacting a central portion of said discharge tube.